

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
20 January 2005 (20.01.2005)

PCT

(10) International Publication Number
WO 2005/005494 A2

(51) International Patent Classification⁷: **C08F 10/00**

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GI, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

(21) International Application Number:
PCT/EP2004/051370

(22) International Filing Date: **6 July 2004 (06.07.2004)**

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI,
SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

(25) Filing Language: **English**

Published:

(26) Publication Language: **English**

— without international search report and to be republished
upon receipt of that report

(30) Priority Data:
03102061.3 9 July 2003 (09.07.2003) EP

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(71) Applicant (for all designated States except US): **ATO-FINA RESEARCH [BE/BE]; Zone Industrielle C, B-7181 Senneffe (BE)**

(72) Inventor; and

(75) Inventor/Applicant (for US only): **RAZAVI, Abbas [IR/BE]; 35, Domaine de la Brisée, B-7000 Mons (BE)**

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,

A2

(54) Title: HETEROGENISATION OF CATALYST COMPONENTS

(57) **Abstract:** Provided is a method for the production of an olefin polymer, which method comprises polymerising an olefin monomer in the presence of a metallocene catalyst, which catalyst comprises one or more alkyl moieties having a terminal olefin group, and is selected from a catalyst of formula (I): R" (CpR_q)XMQ_p, wherein Cp is a substituted or unsubstituted cyclopentadienyl or fluorenyl ring; R" is a structural bridge between Cp and X imparting stereorrigidity to the component; each R is the same or different and is selected from a hydrocarbyl group having from 1-20 carbon atoms, a halogen, an alkoxy group, an alkoxyalkyl group, an alkylamino group or an alkylsilylo group; q is an integer from 0-8; X is a heteroatom from group VA or group VIA; M is a metal atom from group 11113, IVB, VB or VIB in any of its theoretical oxidation states; and each Q is a hydrocarbon having from 1-20 carbon atoms or is a halogen; p is an integer which is the oxidation state of M minus 2; wherein the alkyl moiety having a terminal olefin group is a substituent on R", Cp and/or X; and from a catalysts of formula (II): (L)_nM(Q)_p, wherein L is an heteroatom-containing ligand; n is an integer of 1, 2, or 3; M is selected from Ti, Zr, Sc, V, Cr, Fe, Co, Ni, Pd, or a lanthanide metal; each Q is independently a hydrocarbon having 1-20 carbon atoms or a halogen; and p is the valence of M minus the sum of the coordination numbers of all L; wherein the alkyl moiety having a terminal olefin group is a substituent on L, and/or Q.